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EXAMINER	
SHOSHO, CALLIE E	

ART UNIT	PAPER NUMBER
1714	

DATE MAILED: 01/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/664,895	KAMOTO ET AL.	
	Examiner	Art Unit	
	Callie E. Shosho	1714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 12-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 12-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/12/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. All outstanding rejections are overcome by applicants' amendment filed 11/2/05.

In light of the new grounds of rejection set forth below with respect to Koitabashi et al. (U.S. 6,454,402) wherein the examiner points to portions of the reference not previously cited or discussed in the previous office action mailed 8/3/05, the following action is non-final.

Information Disclosure Statement

2. It is noted that Ma et al. (U.S. 5,085,698), Page et al. (U.S. 6,040,358), and JP 2635235 have been stricken from the IDS filed 8/12/05 as redundant given that these references were already cited on the IDS filed 9/22/03.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 18-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18, which depends on claim 16, has been amended to recite "wherein the ink composition comprises a composition comprising at least the following ink compositions (i), (ii) and (iii)" wherein (i), (ii), and (iii) are different pigments. The scope of the claim is confusing because it is not clear how an ink comprises a composition comprising at least three other ink

compositions. That is, it is not clear what is meant by an ink composition comprising a composition comprising at least the (i), (ii), and (iii) ink compositions. How does the ink comprise three compositions all at once? Does this claim refer to an ink set? Clarification is requested. Further, the claim refers to (i), (ii), and (iii) as ink compositions, but the subsequent recitation of (i), (ii), and (iii) discloses only pigment not an ink composition. Clarification is requested.

Similar questions arise with respect to claims 19, 20, and 21 which each recite similar claim language.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1-10, 12-17, and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. '102 (U.S. 6,773,102) in view Faass et al. (U.S. 5,496,874), Belmont et al. (U.S. 5,630,868), and Koitabashi et al. (U.S. 6,454,402).

Chen et al. '102 disclose aqueous ink jet ink comprising self-dispersing pigment, solvent such as glycol ethers and polyhydric alcohols, nonionic surfactant, and polyester that is obtained from 5-sulfoisophthalic acid salt and polyhydric alcohol such as diethylene glycol, ethylene glycol, and cyclohexanedimethanol. The pigment includes Pigment Blue 15:3, Pigment Red 122, Pigment Yellow 74, and carbon black. For specific types of self-dispersing pigment, Chen et al. '102 refers to Belmont et al. which discloses pigment with attached carboxyl or sulfonic group

(col.5, lines 46-47 and 46 and col.4, lines 7-10, 25-28, and 44-46). The polyester possesses glass transition temperature of 10-80 ^{0}C. The polyester includes those known under the tradename Eastman AQ 55 which is well known, as disclosed by Faass et al. (col.6, lines 12-19), to possess number average molecular weight of 14,000-16,000. Chen et al. '102 also disclose recording method of recording images comprising depositing ink onto recording material from ink jet printer wherein the ink jet printer uses piezo or thermal process to form the recorded image (col.2, lines 25-36 and 66-67, col.4, line 55-col.5, line 16, col.7, lien 43-col.9, line 48, col.9, lines 54-61 and 65-67, col.10, lines 16-27 and 48-65, and col.11, lines 33-50). Although there is no explicit disclosure that water present in the ink has electroconductivity of 250 μS/cm or less, given that, as seen in the examples, Chen et al. '102 uses deionized water, it is clear that the water would inherently possess electroconductivity of 250 μS/cm or less as presently claimed.

The difference between Chen et al. '102 and the present claimed invention is the requirement in the claim that the nonionic surfactant is present in amount of critical micelle concentration or more.

Chen et al. '102 disclose the use of nonionic surfactant, however, there is no disclosure that the nonionic surfactant is present in amount of critical micelle concentration or more.

Koitabashi et al., which is drawn to ink jet inks, disclose the use of nonionic surfactant or Acetylenol in amount equal to or greater than the critical micelle concentration in order to produce ink which is highly penetrable and results in ink with high fixability to paper (col.1, lines 45-61, col.15, lines 32-34 and 55-53, col.19, lines 63-66, col.20, lines 35-58, col.20, line 66-col.21, line 23, and col.22, lines 37-40).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use nonionic surfactant in amount equal to or greater than the critical micelle concentration in Chen et al. '102 in order to produce ink which is highly penetrable and has high fixability to paper, and thereby arrive at the claimed invention.

7. Claims 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. '102 (U.S. 6,773,102) in view of Nagashima (U.S. 4,625,220), Endo et al. (U.S. 4,723,129), and Koitabashi et al. (U.S. 6,454,402).

Chen et al. '102 disclose aqueous ink jet ink comprising self-dispersing pigment and polyester that is obtained from 5-sulfoisophthalic acid salt and polyhydric alcohol such as diethylene glycol, ethylene glycol, and cyclohexanedimethanol. Chen et al. '102 also disclose recording method of recording images comprising depositing ink onto recording material from ink jet printer wherein the ink jet printer uses piezo or thermal process to form the recorded image (col.2, lines 25-36 and 66-67, col.4, line 55-col.5, line 16, col.7, lien 43-col.9, line 48, col.9, lines 54-61 and 65-67, col.10, lines 16-27 and 48-65, and col.11, lines 33-50).

While Chen et al. '102 disclose depositing ink onto substrate using ink jet printer utilizing piezo or thermal process, there is no explicit disclosure regarding the components of the printer. However, it is well known, as disclosed by Nagashima (col.1, lines 22-33 and col.2, lines 26-46), that ink jet printer using piezoelectric process would intrinsically include ink head comprising ink tank for storing the ink, ink chamber for discharging the ink, and piezoelectric element for applying pressure to the ink in response to voltage applied using electrode. Further, it is well known, as disclosed by Endo et al. (col.1, lines 16-19 and col.14, lines 32-36), that ink jet

printer using thermal process would intrinsically include ink head comprising ink tank, i.e. reservoir, for storing the ink, ink chamber having discharge ports for discharging the ink, heater to heat the ink and generate air bubbles, and electrodes for applying voltage.

The difference between Chen et al. '102 and the present claimed invention is the requirement in the claim of that the nonionic surfactant is present in amount of critical micelle concentration or more.

Chen et al. '102 disclose the use of nonionic surfactant, however, there is no disclosure that the nonionic surfactant is present in amount of critical micelle concentration or more.

Koitabashi et al., which is drawn to ink jet inks, disclose the use of nonionic surfactant or Acetylenol in amount equal to or greater than the critical micelle concentration in order to produce ink which is highly penetrable and results in ink with high fixability to paper (col.1, lines 45-61, col.15, lines 32-34 and 55-53, col.19, lines 63-66, col.20, lines 35-58, col.20, line 66-col.21, line 23, and col.22, lines 37-40).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use nonionic surfactant in amount equal to or greater than the critical micelle concentration in Chen et al. '102 in order to produce ink in order to produce ink which is highly penetrable and has high fixability to paper, and thereby arrive at the claimed invention.

8. Claims 1-6, 9-10, and 12 –25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reem et al. (U.S. 6,715,869) in view Faass et al. (U.S. 5,496,874), Peters et al. (U.S. 5,169,881), and Koitabashi et al. (U.S. 6,454,402)

Reem et al. disclose ink jet ink comprising water, pigment such as Pigment Blue 15:3, Pigment Red 122, Pigment Yellow 74, and carbon black, solvent such as polyhydric alcohols and glycol ethers, nonionic surfactant, and sulfopolyester obtained from sodium sulfoisophthalic acid, diethylene glycol, and 1,4-cyclohexanedimethanol. The sulfopolyester includes those known under the tradename Eastman AQ 55 which is well known, as disclosed by Faass et al. (col.6, lines 12-19), to possess number average molecular weight of 14,000-16,000 and as disclosed by Peters et al. (col.7, lines 50-59) to possess glass transition temperature of 55 ^{0}C. There is also disclosed ink set comprising cyan, magenta, yellow, and black inks. Reem et al. also disclose recording method of recording images wherein the inks are deposited on a recording material (col.2, lines 49-52, col.7, lines 14-39, col.8, lines 13-19 and 50-59, and col.9, lines 6-12, 20-25, and 48). Although there is no explicit disclosure that water present in the ink has electroconductivity of 250 μS/cm or less, given that, as seen in the examples, Reem et al. uses deionized water, it is clear that the water would inherently possess electroconductivity of 250 μS/cm or less as presently claimed.

The difference between Reem et al. and the present claimed invention is the requirement in the claim that the nonionic surfactant is present in amount of critical micelle concentration or more.

Reem et al. disclose the use of nonionic surfactant, however, there is no disclosure that the nonionic surfactant is present in amount of critical micelle concentration or more.

Koitabashi et al., which is drawn to ink jet inks, disclose the use of nonionic surfactant or Acetylenol in amount equal to or greater than the critical micelle concentration in order to

produce ink which is highly penetrable and results in ink with high fixability to paper (col.1, lines 45-61, col.15, lines 32-34 and 55-53, col.19, lines 63-66, col.20, lines 35-58, col.20, line 66-col.21, line 23, and col.22, lines 37-40).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use nonionic surfactant in amount equal to or greater than the critical micelle concentration in Reem et al. in order to produce ink which is highly penetrable and has high fixability to paper, and thereby arrive at the claimed invention.

9. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reem et al. in view of Faass et al., Peters et al., and Koitabashi et al. as applied to claims 1-6, 9-10, and 12 –25 above, and further in view of Johnson et al. (U.S. 5,922,118).

The difference between Reem et al. in view of Faass et al., Peters et al., and Koitabashi et al. and the present claimed invention is the requirement in the claims of pigment that has hydrophilic group.

Johnson et al. disclose the use of colored pigment having attached ionic group including carboxyl or sulfonic group wherein the pigment is carbon black or organic pigment. The motivation for using such hydrophilic pigment is to produce ink with improved optical density that has decreased intercolor bleed (col.1, lines 14-16, col.2, lines 54-65, col.4, lines 34-40 and 49-66, col.6, line 50-col.7, line 20, col.10, lines 47-59, and col.11, line 61-col.12, line 7).

In light of the motivation for using hydrophilic pigment disclosed by Johnson et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use

such pigment in the ink of Reem et al. in order to produce ink with improved optical density and decreased intercolor bleed, and thereby arrive at the claimed invention.

10. Claims 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable Reem et al. in view of Faass et al., Peters et al., and Koitabashi et al. as applied to claims 1-6, 9-10, and 12 – 25 above, and further in view of Endo et al. (U.S. 4,723,129)

The difference between Reem et al. in view of Faass et al., Peters et al., and Koitabashi et al. and the present claimed invention is the requirement in the claims of specific ink jet printer.

Reem et al. disclose depositing ink onto substrate to form recorded image, however, there is no specific disclosure in either reference of specific printer to perform the printing.

Endo et al. disclose ink jet printer using thermal process wherein the printer includes ink head comprising ink tank, i.e. reservoir, for storing the ink, ink chamber having discharge ports for discharging the ink, heater to heat the ink and generate air bubbles, and electrodes for applying voltage (col.1, lines 16-19 and col.14, lines 32-36). The motivation for using such printer is to provide clear image without satellite dots or background fog (col.3, lines 30-32).

In light of the motivation for using thermal ink jet printer disclosed by Endo et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use thermal printer as the printer in Reem et al. in order to provide clear image without satellite dots or background fog, and thereby arrive at the claimed invention.

11. Claims 1, 4, 6, 9-10, 12, 16, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. '947 (U.S. 5,129,947) in view of Koitabashi et al. (U.S. 6,454,402).

Sharma et al. '947 disclose ink jet ink comprising water, colorant, polyhydric alcohol such a propylene glycol, nonionic surfactant, i.e. Surfynol, and sulfopolyester obtained from salt of 5-sulfoisophthalic acid and polyhydric alcohol such as diethylene glycol and 1,4-cyclohexanedimethanol . The pigment includes Pigment Blue 15:4. There is also disclosed recording method of recording images wherein the inks are deposited on a recording material (col.1, lines 42-66, col.2, lines 63-64, col.3, line 52-col.4, line 28, col.4, lines 54-57, col.5, line 66, and col.8, line 10).

The difference between Sharma et al. '947 and the present claimed invention is the requirement in the claim that the nonionic surfactant is present in amount of critical micelle concentration or more.

Sharma et al. '947 disclose the use of nonionic surfactant, however, there is no disclosure that the nonionic surfactant is present in amount of critical micelle concentration or more.

Koitabashi et al., which is drawn to ink jet inks, disclose the use of nonionic surfactant or Acetylenol in amount equal to or greater than the critical micelle concentration in order to produce ink which is highly penetrable and results in ink with high fixability to paper (col.1, lines 45-61, col.15, lines 32-34 and 55-53, col.19, lines 63-66, col.20, lines 35-58, col.20, line 66-col.21, line 23, and col.22, lines 37-40).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use nonionic surfactant in amount equal to or greater than the critical micelle concentration

in Sharma et al. '947 in order to produce ink which is highly penetrable and has high fixability to paper, and thereby arrive at the claimed invention.

12. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. '947 in view of Koitabashi et al. as applied to claims 1, 4, 6, 9-10, 12, 16, and 22 above, and further in view of Sorriero et al. (U.S. 5,716,436).

The difference between Sharma et al. '947 in view of Koitabashi et al. and the present claimed invention is the requirement in the claims of the number average molecular weight and glass transition temperature of the sulfopolyester.

Sorriero et al., which is drawn to ink jet inks, disclose the use of water-dispersible polyester comprising aromatic dicarboxylic acid with sulfonate group wherein the polyester possesses molecular weight of 740-8,000 and glass transition temperature of 10-80 ^{0}C in order to produce ink with improved water fastness, abrasion resistance, and image quality (col.1, lines 41-47).

In light of the motivation for using sulfopolyester with specific molecular weight and glass transition temperature disclosed by Sorriero et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use sulfopolyester with such molecular weight and glass transition temperature in the ink of Sharma et al. '947 in order to produce ink with improved water fastness, abrasion resistance, and image quality, and thereby arrive at the claimed invention.

13. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. '947 in view of Koitabashi et al. as applied to claims 1, 4, 6, 9-10, 12, 16, and 22 above, and further in view of Sharma et al. '883 (U.S. 5,464,883).

The difference between Sharma et al. '947 in view of Koitabashi et al. and the present claimed invention is the requirement in the claim that the water present in the ink have electroconductivity of 250 μS/cm or less.

Sharma et al. '883, which is drawn to aqueous ink jet ink comprising sulfopolyester, disclose using deionized water that possesses no ions in order to prevent precipitation of the sulfopolyester (col.4, lines 54-57). It is clear that such deionized water would intrinsically possess electroconductivity of 250 μS/cm or less.

In light of the motivation for using deionized water disclosed by Sharma et al. '883 as described above, it therefore would have been obvious to one of ordinary skill in the art to use deionized water in the ink of Sharma et al. '947 in order to prevent precipitation of the sulfopolyester, and thereby arrive at the claimed invention.

14. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. '947 in view of Koitabashi et al. as applied to claims 1, 4, 6, 9-10, 12, 16, and 22 above, and further in view of Johnson et al. (U.S. 5,922,118).

The difference between Sharma et al. '947 in view of Koitabashi et al. and the present claimed invention is the requirement in the claims of pigment that has hydrophilic group.

Johnson et al. disclose the use of colored pigment having attached ionic group including carboxyl or sulfonic group wherein the pigment is carbon black or organic pigment. The motivation for using such hydrophilic pigment is to produce ink with improved optical density that has decreased intercolor bleed (col.1, lines 14-16, col.2, lines 54-65, col.4, lines 34-40 and 49-66, col.6, line 50-col.7, line 20, col.10, lines 47-59, and col.11, line 61-col.12, line 7).

In light of the motivation for using hydrophilic pigment disclosed by Johnson et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such pigment in the ink of Sharma et al. '947 in order to produce ink with improved optical density and decreased intercolor bleed, and thereby arrive at the claimed invention.

15. Claims 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. '947 in view of Koitabashi et al. as applied to claims 1, 4, 6, 9-10, 12, 16, and 22 above, and further in view of Endo et al. (U.S. 4,723,129)

The difference between Sharma et al. '947 in view of Koitabashi et al. and the present claimed invention is the requirement in the claims of specific ink jet printer.

Sharma et al. '947 disclose depositing ink onto substrate to form recorded image, however, there is no specific disclosure in either reference of specific printer to perform the printing.

Endo et al. disclose ink jet printer using thermal process wherein the printer includes ink head comprising ink tank, i.e. reservoir, for storing the ink, ink chamber having discharge ports for discharging the ink, heater to heat the ink and generate air bubbles, and electrodes for

applying voltage (col.1, lines 16-19 and col.14, lines 32-36). The motivation for using such printer is to provide clear image without satellite dots or background fog (col.3, lines 30-32).

In light of the motivation for using thermal ink jet printer disclosed by Endo et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use thermal printer as the printer in Sharma et al. '947 in order to provide clear image without satellite dots or background fog, and thereby arrive at the claimed invention.

16. Claims 1, 3-4, 6, 9-10, and 12-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erdtmann et al. (U.S. 6,046,253) in view of Koitabashi et al. (U.S. 6,454,402).

Erdtmann et al. disclose ink comprising water, solvent such as glycol ethers and polyhydric alcohols, pigment such as Pigment Blue 15, Pigment Red 122, Pigment Yellow 138, and carbon black, nonionic surfactant, i.e. Surfynol, and sulfopolyester obtained from, for instance, sodium sulfoisophthalic acid, isophthalic acid, and diethylene glycol that possesses glass transition temperature of 41 ^{0}C. There is also disclosed ink set comprising cyan, magenta, yellow, and black inks. Erdtmann et al. et al. also disclose recording method of recording images comprising depositing ink onto recording material from ink jet printer wherein the ink jet printer uses piezo or thermal process to form the recorded image (col.1, lines 9-12, col.2, line 48-col.3, line 55, col.4, lines 10-15 and 38-47, col.5, lines 24-26, 30-34, and 52-57, and col.6, lines 3-11).

The difference between Erdtmann et al. and the present claimed invention is the requirement in the claim that the nonionic surfactant is present in amount of critical micelle concentration or more.

Erdtmann et al. disclose the use of nonionic surfactant, however, there is no disclosure that the nonionic surfactant is present in amount of critical micelle concentration or more.

Koitabashi et al., which is drawn to ink jet inks, disclose the use of nonionic surfactant or Acetylenol in amount equal to or greater than the critical micelle concentration in order to produce ink which is highly penetrable and results in ink with high fixability to paper (col.1, lines 45-61, col.15, lines 32-34 and 55-53, col.19, lines 63-66, col.20, lines 35-58, col.20, line 66-col.21, line 23, and col.22, lines 37-40).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use nonionic surfactant in amount equal to or greater than the critical micelle concentration in Erdtmann et al. in order to produce ink which is highly penetrable and has high fixability to paper, and thereby arrive at the claimed invention.

17. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Erdtmann et al. in view of Koitabashi et al. as applied to claims 1, 3-4, 6, 9-10, and 12-25 above, and further in view of Meyrick et al. (U.S. 6,344,497).

The difference between Erdtmann et al. in view of Koitabashi et al. and the present claimed invention is the requirement in the claims of the number average molecular weight of the sulfopolyester.

Meyrick et al., which is drawn to ink jet inks, disclose the use of sulfonated polyester possessing number average molecular weight of up to 30,000 in order to produce ink with good storage stability (col.5, lines 14-23).

In light of the motivation for using sulfopolyester with specific molecular weight disclosed by Meyrick et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use sulfopolyester with such molecular weight in the ink of Erdtmann et al. in order to produce ink with good storage stability, and thereby arrive at the claimed invention.

18. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Erdtmann et al. in view of Koitabashi et al. as applied to claims 1, 3-4, 6, 9-10, and 12-25 above, and further in view of Sharma et al. '883 (U.S. 5,464,883).

The difference between Erdtmann et al. in view of Koitabashi et al. and the present claimed invention is the requirement in the claim that the water present in the ink have electroconductivity of 250 μS/cm or less.

Sharma et al. '883, which is drawn to aqueous ink jet ink comprising sulfopolyester, disclose using deionized water that possesses no ions in order to prevent precipitation of the sulfopolyester (col.4, lines 54-57). It is clear that such deionized water would intrinsically possess electroconductivity of 250 μS/cm or less.

In light of the motivation for using deionized water disclosed by Sharma et al. '883 as described above, it therefore would have been obvious to one of ordinary skill in the art to use deionized water in the ink of Erdtmann et al. in order to prevent precipitation of the sulfopolyester, and thereby arrive at the claimed invention.

19. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erdtmann et al. in view of Koitabashi et al. as applied to claims 1, 3-4, 6, 9-10, and 12-25 above, and further in view of Johnson et al. (U.S. 5,922,118).

The difference between Erdtmann et al. in view of Koitabashi et al. and the present claimed invention is the requirement in the claims of pigment that has hydrophilic group.

Johnson et al. disclose the use of colored pigment having attached ionic group including carboxyl or sulfonic group wherein the pigment is carbon black or organic pigment. The motivation for using such hydrophilic pigment is to produce ink with improved optical density that has decreased intercolor bleed (col.1, lines 14-16, col.2, lines 54-65, col.4, lines 34-40 and 49-66, col.6, line 50-col.7, line 20, col.10, lines 47-59, and col.11, line 61-col.12, line 7).

In light of the motivation for using hydrophilic pigment disclosed by Johnson et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such pigment in the ink of Erdtmann et al. in order to produce ink with improved optical density and decreased intercolor bleed, and thereby arrive at the claimed invention.

20. Claims 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erdtmann et al. (U.S. 6,046,253) in view of Nagashima (U.S. 4,625,220), Endo et al. (U.S. 4,723,129), and Koitabashi et al. (U.S. 6,454,402).

Erdtmann et al. disclose ink comprising water, pigment, and sulfopolyester obtained from, for instance, sodium sulfoisophthalic acid, isophthalic acid, and diethylene glycol. Erdtmann et al. et al. also disclose recording method of recording images comprising depositing ink onto recording material from ink jet printer wherein the ink jet printer uses piezo or thermal

process to form the recorded image (col.1, lines 9-12, col.2, line 48-col.3, line 55, col.4, lines 10-15 and 38-47, col.5, lines 24-26, 30-34, and 52-57, and col.6, lines 3-11).

While Erdtmann et al. disclose depositing ink onto substrate using ink jet printer utilizing piezo or thermal process, there is no explicit disclosure regarding the components of the printer. However, it is well known, as disclosed by Nagashima (col.1, lines 22-33 and col.2, lines 26-46), that ink jet printer using piezoelectric process would intrinsically include ink head comprising ink tank for storing the ink, ink chamber for discharging the ink, and piezoelectric element for applying pressure to the ink in response to voltage applied using electrode. Further, it is well known, as disclosed by Endo et al. (col.1, lines 16-19 and col.14, lines 32-36), that ink jet printer using thermal process would intrinsically include ink head comprising ink tank, i.e. reservoir, for storing the ink, ink chamber having discharge ports for discharging the ink, heater to heat the ink and generate air bubbles, and electrodes for applying voltage.

The difference between Erdtmann et al. and the present claimed invention is the requirement in the claim that the nonionic surfactant is present in amount of critical micelle concentration or more.

Erdtmann et al. disclose the use of nonionic surfactant, however, there is no disclosure that the nonionic surfactant is present in amount of critical micelle concentration or more.

Koitabashi et al., which is drawn to ink jet inks, disclose the use of nonionic surfactant or Acetylenol in amount equal to or greater than the critical micelle concentration in order to produce ink which is highly penetrable and results in ink with high fixability to paper (col.1, lines 45-61, col.15, lines 32-34 and 55-53, col.19, lines 63-66, col.20, lines 35-58, col.20, line 66-col.21, line 23, and col.22, lines 37-40).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use nonionic surfactant in amount equal to or greater than the critical micelle concentration in Erdtmann et al. in order to produce ink which is highly penetrable and has high fixability to paper, and thereby arrive at the claimed invention.

21. Claims 1-6, 9-10, 12-17, and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. '098 (U.S. 2003/0187098) in view of Faass et al. (U.S. 5,496,874), Peters et al. (U.S. 5,169,881), and Koitabashi et al. (U.S. 6,454,402).

Chen et al. '098 disclose aqueous ink jet ink comprising pigment, solvent such as glycol ethers and polyhydric alcohols, nonionic surfactant, and water-dispersible sulfonated polyester that is obtained from dicarboxylic acid having a metal sulfonate group and polyhydric alcohol such as diethylene glycol, ethylene glycol, and 1,4-cyclohexanedimethanol. The pigment includes Pigment Blue 15:3, Pigment Red 122, Pigment Yellow 74, and carbon black. The polyester includes those known under the tradename Eastman AQ 55 which is well known, as disclosed by Faass et al. (col.6, lines 12-19), to possesses number average molecular weight of 14,000-16,000 and as disclosed by Peters et al. (col.7, lines 50-59) to possess glass transition temperature of 55 ^{0}C. Chen et al. '098 also disclose recording method of recording images comprising depositing ink onto recording material from ink jet printer wherein the ink jet printer uses piezo process to form the recorded image (paragraphs 1, 9-12, 17, 19-20, 22-23, 27, 30, 32, and 49). Although there is no explicit disclosure that water present in the ink has electroconductivity of 250 μS/cm or less, given that, as seen in the examples, Chen et al. '098

uses deionized water, it is clear that the water would inherently possess electroconductivity of 250 μS/cm or less as presently claimed.

The difference between Chen et al. '098 and the present claimed invention is the requirement in the claim that the nonionic surfactant is present in amount of critical micelle concentration or more.

Chen et al. '098 disclose the use of nonionic surfactant, however, there is no disclosure that the nonionic surfactant is present in amount of critical micelle concentration or more.

Koitabashi et al., which is drawn to ink jet inks, disclose the use of nonionic surfactant or Acetylenol in amount equal to or greater than the critical micelle concentration in order to produce ink which is highly penetrable and results in ink with high fixability to paper (col.1, lines 45-61, col.15, lines 32-34 and 55-53, col.19, lines 63-66, col.20, lines 35-58, col.20, line 66-col.21, line 23, and col.22, lines 37-40).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use nonionic surfactant in amount equal to or greater than the critical micelle concentration in Chen et al. '098 in order to produce ink which is highly penetrable and results in ink with high fixability to paper, and thereby arrive at the claimed invention.

22. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. '098 in view of Faass et al., Peters et al., and Koitabashi et al. as applied to claims 1-6, 9-10, 12-17, and 22-23 above, and further in view of Johnson et al. (U.S. 5,922,118).

The difference between Chen et al. '098 in view of Faass et al., Peters et al., and Koitabashi et al. and the present claimed invention is the requirement in the claims of pigment that has hydrophilic group.

Johnson et al. disclose the use of colored pigment having attached ionic group including carboxyl or sulfonic group wherein the pigment is carbon black or organic pigment. The motivation for using such hydrophilic pigment is to produce ink with improved optical density that has decreased intercolor bleed (col.1, lines 14-16, col.2, lines 54-65, col.4, lines 34-40 and 49-66, col.6, line 50-col.7, line 20, col.10, lines 47-59, and col.11, line 61-col.12, line 7).

In light of the motivation for using hydrophilic pigment disclosed by Johnson et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such pigment in the ink of Chen et al. '098 in order to produce ink with improved optical density and decreased intercolor bleed, and thereby arrive at the claimed invention.

23. Claims 26 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al. '098 (U.S. 2003/0187098) in view of Nagashima (U.S. 4,625,220) and Koitabashi et al. (U.S. 6,454,402).

Chen et al. '098 disclose aqueous ink jet ink comprising pigment and water-dispersible sulfonated polyester that is obtained from dicarboxylic acid having a metal sulfonate group and polyhydric alcohol such as diethylene glycol, ethylene glycol, and 1,4-cyclohexanedimethanol. Chen et al. '098 also disclose recording method of recording images comprising depositing ink onto recording material from ink jet printer wherein the ink jet printer uses piezo process to form the recorded image (paragraphs 1, 9-12, 17, 19-20, 22-23, 27, 30, 32, and 49).

While Chen et al. '098 disclose depositing ink onto substrate using ink jet printer utilizing piezo process, there is no explicit disclosure regarding the components of the printer. However, it is well known, as disclosed by Nagashima (col.1, lines 22-33 and col.2, lines 26-46), that ink jet printer using piezoelectric process would intrinsically include ink head comprising ink tank for storing the ink, ink chamber for discharging the ink, and piezoelectric element for applying pressure to the ink in response to voltage applied using electrode.

The difference between Chen et al. '098 and the present claimed invention is the requirement in the claim that the nonionic surfactant is present in amount of critical micelle concentration or more.

Chen et al. '098 disclose the use of nonionic surfactant, however, there is no disclosure that the nonionic surfactant is present in amount of critical micelle concentration or more.

Koitabashi et al., which is drawn to ink jet inks, disclose the use of nonionic surfactant or Acetylenol in amount equal to or greater than the critical micelle concentration in order to produce ink which is highly penetrable and results in ink with high fixability to paper (col.1, lines 45-61, col.15, lines 32-34 and 55-53, col.19, lines 63-66, col.20, lines 35-58, col.20, line 66-col.21, line 23, and col.22, lines 37-40).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use nonionic surfactant in amount equal to or greater than the critical micelle concentration in Chen et al. '098 in order to produce ink which is highly penetrable and has high fixability to paper, and thereby arrive at the claimed invention.

Response to Arguments

24. Applicants' arguments regarding Blount (U.S. 4,9990,593) have been fully considered but they are moot in view of the discontinuation of the use of this reference against the present claims.

25. Applicants' arguments filed 11/2/05 have been fully considered but, with the exception of arguments relating to Blount, are not persuasive.

Specifically, applicants' argue that none of the cited primary references, namely, Chen et al. '102, Reem et al., Sharma et al. '957, Erdtmann et al., and Chen et al. '098, disclose nonionic surfactant and request that examiner cite where each reference discloses the use of nonionic surfactant.

It is noted that Chen et al. '102 disclose the use of nonionic surfactant in col.10, lines 48-57, Reem et al. disclose the use of nonionic surfactant in col.9, lines 21-22, Sharma et al. '947 disclose the use of nonionic surfactant in col.2, lines 63-64, Erdtmann et al. disclose the use of nonionic surfactant in col.5, lines 24-25, and Chen et al. '098 disclose the use of nonionic surfactant in paragraph 30. With respect to Sharma et al. and Erdtmann et al. it is noted that these references disclose the use of surfactant known under the tradename Surfynol which is a nonionic surfactant and is the same type of nonionic surfactant, i.e. acetylene alcohol/alkylene oxide adduct, as the surfactant known under the tradename Acetylenol disclosed by Koitabashi et al. as disclosed below.

Applicants also argue that there is no disclosure in Chen et al. '102, Reem et al., Sharma et al. '957, Erdtmann et al., or Chen et al. '098 that the content of the nonionic surfactant is at the critical micelle concentration or more as now required in all the present claims.

It is agreed that there is no disclosure regarding the content of nonionic surfactant in Chen et al. '102, Reem et al., Sharma et al. '957, Erdtmann et al., or Chen et al. '098 which is why each reference is now used in combination with Koitabashi et al. which discloses the use of nonionic surfactant at amounts equal to or greater than the critical micelle concentration.

Applicants argue that Koitabashi et al. is not a relevant reference against the present claims given that there is no disclosure in Koitabashi et al. of polyester as presently claimed.

However, while it is agreed that there is no disclosure in Koitabashi et al. of polyester as presently claimed, note that Koitabashi et al. is used as teaching reference, and therefore, it is not necessary for this secondary reference to contain all the features of the presently claimed invention, *In re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973), *In re Keller* 624 F.2d 413, 208 USPQ 871, 881 (CCPA 1981). Rather this reference teaches a certain concept, namely, the use of nonionic surfactant in ink jet inks in an amount equal to or greater than the critical micelle concentration produces ink with high penetrability and high fixability to paper, and in combination with the primary reference, discloses the presently claimed invention.

Applicants also argue that Koitabashi et al. is not a relevant reference against the present claims given that the use of nonionic surfactant in Koitabashi et al. is as a penetrating agent which is applied separately to a surface to be printed and is not part of the ink.

However, while in one embodiment of Koitabashi et al. it is agreed that the nonionic surfactant is used in treating liquid and not ink, it is noted that in another embodiment (col.20,

lines 35-58 and col.20, line 66-col.22, line 23), the nonionic surfactant or Acetylenol is in fact used in the ink. Koitabashi et al. disclose using the nonionic surfactant, i.e. Acetylenol, at content equal to or greater than the critical micelle concentration in order to produce ink that is highly penetrable and thus, has improved fixing ability to substrate.

In light of the above, it is the examiner's position that Koitabashi et al. is a relevant reference against the present claims.

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Callie E. Shosho whose telephone number is 571-272-1123. The examiner can normally be reached on Monday-Friday (6:30-4:00) Alternate Fridays Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CS
1/3/06

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